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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,873	06/27/2005	Noriya Izu	274380US0PCT	1755
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER ZHAO, XIAO SI	
			ART UNIT 4172	PAPER NUMBER
			NOTIFICATION DATE 07/25/2008	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/540,873

Applicant(s)

IZU ET AL.

Examiner

XIAO ZHAO

Art Unit

4172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date 7/15/2005, 1/10/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claims 1-8 are pending. Claims 1-7 are under examination. Claim 8 is withdrawn.

Election/Restrictions

1. Claim 8 is withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 5/29/2008.
2. Applicants' election with traverse of claims 1-8, in the reply filed on 6/30/2008 is acknowledged. The traversal is on the ground(s) that there is a commonality that exists between the groups which is a technical relationship that involves the same feature, and it is this feature that defines the contributions which each of the groups taken as a whole makes over the prior art. In addition, no substantial burden exists in searching all of the claims together. This is not found persuasive because of the following reasons:
 - a. The cerium oxide-based porous thick film is a common technical feature and is the commonality that exists between Group I and II. However, as cited in the previous requirement for restriction/election mailed on 5/29/2008, Hong et al. (US 2003/0082436 A1) makes clear that the invention of the Group I and II lack a special technical feature because Hong et al. teach the porous ceria (cerium oxide) film being prepared by a materially different method. Thus, even though the technical feature of the porous cerium oxide film is common technical feature between Group I and II; it is not a special technical feature and thus, under PCT Rule 13.2, they do not relate to a single general inventive concept.

- b. Restriction under PCT and national stage applications does not require the proof of a search burden.
- c. The Applicants elected Group I - a group of method claims. Where claims are directed to a product and a process of making, rejoinder is only appropriate if the non-elected group is the process of making. A rejoinder would not be appropriate in the instant case since the Applicants elected the process claims. See MPEP § 821.04.

The requirement is still deemed proper and is therefore made FINAL.

- 3. This application contains claim 8 drawn to an invention nonelected with traverse in the reply filed on 6/30/2008. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

- 4. The abstract of the disclosure is objected to because the word "effect" used should be changed to "affect". Correction is required. See MPEP § 608.01(b).
 - 5. The disclosure is objected to because of the following informalities: "effect" or "effected" is used multiple times throughout the disclosure . On page 8 in the disclosure "effected" is used in the first paragraph as "this is because if particle growth is not effected, ..." this should be changed to "affected". In addition, all other effect or "effected" should be changed to "affect" or "affected" when appropriate.
- Appropriate correction is required.

Claim Objections

6. Claim 1 is objected to because of the following informalities: "a heat treatment step of carrying out heat treatment to effect" should be changed to "a heat treatment step of carrying out heat treatment to affect". "a step of mixing the particle growth effected powder..." should be changed to "a step of mixing the particle growth affected powder..." Likewise, all other "effected" or "effect" in other claims should be changed to "affected" or "affect" when appropriate.

"materialpowdertoaparticlediameterlessthantheaverageparticle" has no space between the words. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the maximum size the average particle diameter of the particle growth-affected powder can be. From claim 1, the Applicants claim that the particle growth-affected powder needs to be less than the average particle diameter of the ultimately obtained thick film. Claim 2 further limits that by stating that the thick film is not more than 200 nm, thus, in claim 3 the average particle diameter of the particle growth-affected powder cannot only be at least 45 nm but also less than 200 nm.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (US 5945369) in view of Hata et al. (US 6068828), Utter et al. (US 5819652) and Ishikawa et al. (US 6521671).

Claim 1 is drawn to a method of manufacturing a porous thick film comprising taking a fine particle powder of an oxide containing cerium oxide as a raw material powder, preparing a paste containing the oxide, printing the paste onto a substrate by screen printing, calcining and sintering, the method comprising of a heat treatment step of carrying out heat treatment to affect particle growth from the average particle diameter of the raw material powder to a particle diameter less than the average particle diameter of the ultimately obtained thick film; a step of mixing the particle growth-affected powder with a solvent; a step of removing a precipitate; a step of evaporating

off the solvent; and a step of mixing the resulting oxide with an organic binder to obtain the paste.

Claims 2-7 further limits the independent method of claim 1 wherein the average particle diameter of the porous thick film is not more than 200 nm; the average particle diameter of the particle growth-affected powder obtained through the heat treatment step is at least 45 nm; the average particle diameter of the raw material powder before the heat treatment step is at least 10 nm but less than 45 nm; the heat treatment occurs at 880 to 920 °C; the proportion by weight of the oxide in the paste is adjusted to 10 to 30 wt%; and the fine particle powder of an oxide containing cerium oxide is a fine particle powder of an oxide containing cerium oxide and zirconium oxide.

Kimura et al. teach a catalyst for purifying exhaust gases which includes a porous support; a cerium oxide or a solid solution of a cerium oxide and a zirconium oxide which is loaded on the porous support, the cerium oxide or the solid solution has an average particle diameter of from 5 to 100 nm (see abstract). The solid solution can also be a combination of cerium oxide and a zirconium oxide (see col. 3, 10-12). The raw material cerium oxide powder goes through a heat treatment in reducing atmosphere (col. 8, 67 to col. 9, 2). The heat treatment is in a temperature range of from 300 to 1200 °C. It is advantage to carry this heat treatment since crystalline particles of the cerium oxide release oxygen to cause oxygen deficiency therein; it is believed that the presence of oxygen deficiency further promotes the solid solution of the zirconium oxide in the cerium oxide (col. 9, 10-16). When the heat treatment is carried out, the particles of the raw material powders may grow granularly or sinter each

other (col. 9, 18-19). From the first preferred embodiment, the cerium oxide is in an amount of 30% by weight and has an average particle diameter of 7 nm; after the whole process, the average particle diameter is 35 nm. The raw material powder can be dispersed in a dispersing medium such as ethanol (col. 10, 40-42). The slurry can be coated and calcinated on a support substrate (col. 4, 48-52).

Kimura et al. fail to teach dispersing agglomerated particles in the solvent (which is using a ultrasonic homogenizer as disclosed by the Applicants on page 9 in the disclosure), removing the precipitate, evaporating off the solvent, mixing the resulting oxide with an organic binder to obtain a paste, the coating is printing the paste onto a substrate by screen printing followed by sintering.

In addition, Kimura et al. did not disclose that the raw material powder is at least 10 nm but less than 45 nm; the heat treatment occurs at 880 to 920 °C after the heat treatment and that the powder is at least 45 nm after the heat treatment. However it would have been obvious to one of ordinary skill in the art that controlling the particle diameter of cerium oxide is important since Kimura et al. disclose (col. 2, 7-15) that a cerium powder that has too large of a diameter cannot keep exhaust gases in predetermined atmosphere by storing oxygen in and releasing oxygen from the cerium oxide. Thus, manipulating the diameter of the raw material, temperature of the heat treatment (which would determine the diameter of the powder after the treatment) would have been be obvious one of ordinary skill in the art at the time of the invention to achieve a desirable final particle diameter suitable for the application to a substrate.

Hata et al. teach that zirconia is a main component that can be effectively used as sensor parts in; the zirconia is usually produced in the art in which a slurry containing zirconia powder, organic binder, and a solvent is formed into a sheet; the sheet is dried to evaporate the solvent; and then it is placed on a setter(substrate) and calcined to decompose or remove the organic binder and to sinter the ceramic powder (col. 1, 25-35). Furthermore Hata et al. disclose that the zirconia powder can contain cerium oxide as well (col. 6, 34-49).

Utter et al. teach that screen printing of conductive paste onto unfired ceramic substrates or sheets is a well known technique in the art (col. 1, 13-15).

Ishikawa et al. teach that an ultrasonic homogenizer was used to disperse particles in a mixture (col. 13, 64-66).

It would have been obvious to one of ordinary skill in the art to incorporate the method taught by Hata et al., Utter et al., and Ishikawa et al. to Kimura et al. One would have been motivated to do this because this is a combination of prior elements according to known method to yield predictable results. In addition, Kimura et al. disclose that the cerium oxide powder can be dispersed in any desired manner into the solvent (col. 10, 45-47) thus it would have been obvious to use a ultrasonic homogenizer to disperse the particles into the solvent since this would result in well dispersed particles.

Conclusion

Claims 1-7 are rejected.

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XIAO ZHAO whose telephone number is (571)270-5343. The examiner can normally be reached on Monday to Friday 7:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Xiao S Zhao/
Examiner, Art Unit 4172

/Alain L. Bashore/
Primary Examiner, Art Unit 1792